

REMARKS

Claims 23-50 were pending in this application. Claims 23-30 and 48-50 have been amended hereby to correct matters of form. Accordingly, claims 23-50 remain pending herein and are believed to be in condition for allowance for the reasons stated below.

Paragraph 1 of the Office Action rejected claims 23-50 under 35 U.S.C. §112, second paragraph. This ground of rejection is respectfully traversed for the following reasons.

Applicant has amended the claims to address the issues raised in the Office Action. With respect to the rejection of claims 26 and 27, Applicant respectfully submits that the last two lines of those claims are proper in that Applicant wishes to emphasize that the discharge gas does not contribute to film formation, which is an important aspect of the instant invention. Specifically, in accordance with the present invention, it is desirable that film formation does not begin until the plasma is stabilized so that film formation can be effected under more controlled circumstances. As such, it is believed that the last two lines of claims 26 and 27 are consistent with an important aspect of the present invention and are therefore believed to be properly included in those claims.

In view of the amendments to the claims, Applicant respectfully requests that the §112, second paragraph rejection of claims 23-50 be reconsidered and withdrawn.

Paragraph 2 of the Office Action rejected claims 23-50 under 35 U.S.C. §112, first paragraph. This ground of rejection is respectfully traversed.

It is contended in the Office Action that the claims are "replete with new matter." As an example, it is asserted in the Office Action that there is no support for "amorphous film

comprising silicon” or “a film comprising carbon”. However, the present specification, although not expressly reciting “amorphous film comprising silicon”, for example, clearly teaches an amorphous silicon film which is certainly an “amorphous film comprising silicon.” Since the pending claims read on at least one embodiment described in the specification, the claims, as presently drafted, are believed to be in compliance with §112, first paragraph. Indeed, it is fundamental that an Applicant’s claims can be broader than the specification which supports those claims.

Likewise, silane, a gas disclosed in the specification as being decomposed to form an amorphous film, is certainly a “silicon containing gas” as recited in the claims. As such, it is believed that the phraseology used in the claims is proper in that there is clear support in the specification for the recited limitation. The argument above is equally applicable to the “carbon containing gas” terminology.

Finally, with respect to film deposition being caused by plasma or RF discharge, Applicant has amended the claims to delete the word “therein” in the claims to clarify that the amorphous film is formed by decomposing a gas using radio frequency energy.

In view of the above, Applicant respectfully submits that all of claims 23-50 comply with the requirements of §112 and, accordingly, respectfully requests that the rejection of those claims based on §112 be reconsidered and withdrawn.

Paragraph 4 of the Office Action objected to the disclosure based on the use of particular terms. Applicant respectfully submits that the terms “decompressed” or “decompression chamber” are readily understandable by one of ordinary skill in the art as used in the present

specification. Nevertheless, the specification has been amended as set forth above to add the word "vacuum" to even further emphasize the function of the chamber. The Examiner's attention is directed to page 18, lines 12 and 13 of the present specification in which there is express support with respect to the chamber being able to hold a "vacuum", i.e., be in a decompressed state.

With respect to "silicide gas", Applicant notes that this term is used generically for a gas that contains silicon. It is respectfully submitted that page 7, line 27 to page 8, line 12 makes this definition clear.

In view of the above, it is respectfully requested that the objection to the disclosure be reconsidered and withdrawn.

Paragraph 6 of the Office Action rejected claims 23, 25-29, 45, 47, 48 and 50 under 35 U.S.C. §103(a) over Kozuka et al. in view of Gupta et al. Further, paragraph 7 of the Office Action rejected claims 24, 46 and 49 under 35 U.S.C. §103(a) further in view of Mei or Kaschmitter et al. or Yamazaki et al. Paragraph 8 of the Office Action rejected claims 31-44 under 35 U.S.C. §103(a) over Kozuka et al., Gupta et al., Mei et al., Kaschmitter et al., or Yamazaki et al. These grounds of rejection are respectfully traversed for the following reasons.

The present invention is directed to a technique for forming a thin film via a plasma CVD method. In particular, the present invention relates to a technique whereby the substrate is not contaminated with minute particles floating in a chamber. In accordance with the present invention, the timing of the starting and discontinuing of film formation is shifted with respect to the timing of the starting and discontinuing of the supply of the discharge gas. In this way, it is

possible to prevent the instability at the start of discharge from affecting film formation and to prevent minute particles after film formation from adhering to the surface of the film. These features of the present invention are supported at the end of Embodiment 5, page 30 of the present specification, for example. Moreover, the supply of discharge gas, such as hydrogen, is stopped simultaneously with the start of the supply of the silicon containing gas and vice versa. This feature of the present invention is shown clearly in Fig. 7. An advantage of the present invention is that abrupt discharge, such as arc discharge, can be prevented and the film quality of a formed film is not damaged. This feature of the invention is disclosed at page 12, lines 13-16 of the present specification.

In the obviousness rejection, it is asserted that discharge gas, such as hydrogen of the present invention, corresponds to the dilutant gas as disclosed in Kozuka et al. However, while the dilutant gas is necessarily used during film formation in Kozuka et al., the discharge gas of the present invention is stopped when the supply of the film forming gas is started. Accordingly, Applicant respectfully submits that Kozuka et al. actually teach away from the method of the present invention.

Further, it is alleged in the Office Action that Gupta et al. teach that the inert gas stops simultaneously with the start of the reactant gas, as noted at page 7, lines 1-2 of the Office Action. Column 5, lines 40-42 of Gupta et al. do teach that the flow of inert gas to the reaction chamber may be stopped and the desired reactant gas introduced into the chamber. However, there is, in fact, no teaching in Gupta et al. to stop the supply of the inert gas simultaneously with the start of supply of the reactant gas.

Applicant notes that the burden of establishing a prima facie case of obviousness lies with the Patent Office. In re Fine, 5 USPQ2d 1596 (Fed. Cir. 1988). To establish a prima facie case of obviousness, there must be (1) some suggestion or motivation (either in the references themselves or in the knowledge generally available to one of ordinary skill in the art) to modify the reference or to combine reference teachings to achieve the claimed invention and (2) the prior art must teach or suggest all the claim limitations. MPEP §2143. Also, simply because the references could be does not mean that they should be. MPEP §2143.01, citing In re Mills, 16 USPQ2d 1430 (Fed. Cir. 1990).

Since Kozuka et al. actually teach away from the presently claimed invention and Gupta et al. fail to teach a simultaneous stoppage of inert gas when the reactant gas is supplied, Applicant respectfully submits that neither the first nor the second prong discussed above has been fulfilled, and, therefore, a *prima facie* case of obviousness has not been made. Further, it is respectfully submitted that none of Mei, Kaschmitter et al. or Yamazaki et al. overcomes the deficiencies of Kozuka et al. and Gupta et al. Accordingly, Applicant respectfully requests that the §103(a) rejections of claims 23-50 be reconsidered and withdrawn.

In view of the above, all of the claims in this case are believed to be in condition for allowance. Should the Examiner deem that any further action by the Applicant would be desirable in placing this application in even better condition for issue, she is requested to contact the undersigned.

Respectfully submitted,

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